

Application No. 10/668,144
Amendment under 37 C.F.R. §1.111 dated February 11, 2005
Response to the Office Action of November 16, 2004

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Currently Amended): A power transfer apparatus provided between an input shaft and an output shaft for selectively changing the speed of the output shaft relative to the speed of the input shaft, the power transfer apparatus comprising:

a clutch having a clutch inner hub fixed to the input shaft, a clutch guide, a plurality of clutch discs attached to the clutch inner hub, a plurality of clutch plates attached to the clutch guide so as to be disposed alternately with the clutch discs, a clutch piston and biasing unit for biasing the clutch piston in a direction in which the clutch discs engage with the clutch plates;

a transmission brake serially disposed in an axial direction of the clutch and having a brake inner hub coupled with the clutch piston at one end thereof, a plurality of brake discs coupled with the brake inner hub and a plurality of brake plates coupled with ~~the~~ a casing in such a manner as to be disposed alternately with the brake discs;

an actuator serially disposed in an axial direction of the transmission brake for disengaging the clutch against force of the biasing unit at the same time of activating the transmission brake; and

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a planetary carrier sub-assembly serially disposed in the axial direction of the clutch and having a planetary carrier rotatably disposed around the input shaft and the output shaft and coupled with the clutch guide, a first pinion gear rotatably carried on the planetary carrier, a second pinion gear having the number of teeth which is different from that of the first pinion gear, a first sun gear fixed to the input shaft and meshing with the first pinion gear and a second sun gear fixed to the output shaft and meshing with the second pinion gear[[:]],

wherein the clutch, transmission brake, planetary carrier sub-assembly and actuator are serially disposed along the axial direction, and radial positions of the clutch, transmission brake, planetary carrier sub-assembly and actuator overlap each other.

Claim 2 (Original): A power transfer apparatus as set forth in Claim 1, wherein the clutch further comprises a one-way clutch interposed between the clutch inner hub and the clutch guide.

Claim 3 (Currently Amended): A power ~~transmission~~ transfer apparatus as set forth in Claim 1, wherein the clutch piston is disposed within a space defined between the clutch guide and a radial out side of the clutch plates so as to be extended in the axial direction of the clutch.

Claim 4 (Original): A power transfer apparatus as set forth in Claim 1, wherein the first and second pinion gears are formed integrally.

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Claim 5 (Original): A power transfer apparatus as set forth in Claim 1, wherein the input shaft and the output shaft are coaxially disposed.

Claim 6 (Currently Amended): A power transfer apparatus as set forth in Claim 1, ~~further comprising;~~ wherein

[[a]] the casing ~~accommodating~~ accommodates at least a portion of the input shaft and at least a portion of the output shaft, the clutch, the transmission brake, the actuator and the planetary carrier sub-assembly.

Claim 7 (Original): A power transfer apparatus as set forth in Claim 1, further comprising;

an oil pump sub-assembly for activating the actuator.

Claim 8 (Original): A power transfer apparatus as set forth in Claim 7, wherein the oil pump sub-assembly is serially disposed in the axial direction of the output shaft.

Claim 9 (New): A power transfer apparatus provided between an input shaft and an output shaft for selectively changing the speed of the output shaft relative to the speed of the input shaft, the power transfer apparatus comprising:

a clutch having a clutch inner hub fixed to the input shaft, a clutch guide, a plurality of clutch discs attached to the clutch inner hub, a plurality of clutch plates attached to the clutch guide so as to be disposed alternately with the clutch discs, a clutch piston and biasing unit for biasing the clutch piston in a direction in which the clutch discs engage with the clutch plates;

a transmission brake serially disposed in an axial direction of the clutch and having a brake inner hub coupled with the clutch piston at one end thereof, a plurality of brake discs coupled with the brake inner hub and a plurality of brake plates coupled with a casing in such a manner as to be disposed alternately with the brake discs;

an actuator serially disposed in an axial direction of the transmission brake for disengaging the clutch against force of the biasing unit at the same time of activating the transmission brake; and

a planetary carrier sub-assembly serially disposed in the axial direction of the clutch and having a planetary carrier rotatably disposed around the input shaft and the output shaft and coupled with the clutch guide, a first pinion gear rotatably carried on the planetary carrier, a second pinion gear having the number of teeth which is different from that of the first pinion gear, a first sun gear fixed to the input shaft and meshing with the first pinion gear and a second sun gear fixed to the output shaft and meshing with the second pinion gear,

wherein the clutch further comprises a one-way clutch interposed between the clutch inner hub and the clutch guide.

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Claim 10 (New): A power transfer apparatus as set forth in Claim 9, wherein the clutch piston is disposed within a space defined between the clutch guide and a radial out side of the clutch plates so as to be extended in the axial direction of the clutch.

Claim 11 (New): A power transfer apparatus as set forth in Claim 9, wherein the first and second pinion gears are formed integrally.

Claim 12 (New): A power transfer apparatus as set forth in Claim 9, wherein the input shaft and the output shaft are coaxially disposed.

Claim 13 (New): A power transfer apparatus as set forth in Claim 9, further comprising; an oil pump sub-assembly for activating the actuator.

Claim 14 (New): A power transfer apparatus as set forth in Claim 13, wherein the oil pump sub-assembly is serially disposed in the axial direction of the output shaft.

Claim 15 (New): A power transfer apparatus provided between an input shaft and an output shaft for selectively changing the speed of the output shaft relative to the speed of the input shaft, the power transfer apparatus comprising:

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a clutch having a clutch inner hub fixed to the input shaft, a clutch guide, a plurality of clutch discs attached to the clutch inner hub, a plurality of clutch plates attached to the clutch guide so as to be disposed alternately with the clutch discs, a clutch piston and biasing unit for biasing the clutch piston in a direction in which the clutch discs engage with the clutch plates;

a transmission brake serially disposed in an axial direction of the clutch and having a brake inner hub coupled with the clutch piston at one end thereof, a plurality of brake discs coupled with the brake inner hub and a plurality of brake plates coupled with the casing in such a manner as to be disposed alternately with the brake discs;

an actuator serially disposed in an axial direction of the transmission brake for disengaging the clutch against force of the biasing unit at the same time of activating the transmission brake;

a planetary carrier sub-assembly serially disposed in the axial direction of the clutch and having a planetary carrier rotatably disposed around the input shaft and the output shaft and coupled with the clutch guide, a first pinion gear rotatably carried on the planetary carrier, a second pinion gear having the number of teeth which is different from that of the first pinion gear, a first sun gear fixed to the input shaft and meshing with the first pinion gear and a second sun gear fixed to the output shaft and meshing with the second pinion gear; and

an oil pump sub-assembly for activating the actuator, wherein the oil pump sub-assembly is serially disposed in the axial direction of the output shaft.

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Claim 16 (New): A power transfer apparatus as set forth in Claim 15, wherein the clutch further comprises a one-way clutch interposed between the clutch inner hub and the clutch guide.

Claim 17 (New): A power transfer apparatus as set forth in Claim 15, wherein the clutch piston is disposed within a space defined between the clutch guide and a radial out side of the clutch plates so as to be extended in the axial direction of the clutch.

Claim 18 (New): A power transfer apparatus as set forth in Claim 15, wherein the first and second pinion gears are formed integrally.

Claim 19 (New): A power transfer apparatus as set forth in Claim 15, wherein the input shaft and the output shaft are coaxially disposed.